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FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEY and WATER SUPPLY FORECASTS for

COLORADO, RIO GRANDE, PLATTE and ARKANSAS DRAINAGE BASINS

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE, and

COLORADO AGRICULTURAL EXPERIMENT STATION, STATE ENGINEER of COLORADO and STATE ENGINEER of NEW MEXICO

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, National Park Service, Bureau of Reclamation, State Engineers of Utah and Wyoming; and other Federal, State and private organizations.

MAY 1, 1958

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1300 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS RIVER BASINS	ISSUED	COOPERATING WITH	LOCATION
	MONTHLY (FEBMAY)	Colo, Exp. Station	FT. COLLINS, COLO.
COLUMBIA Includes Alaska	MONTHLY (JAN MAY)		BOISE, IDAHO
UPPER MISSOURI	MONTHLY (FEB MAY)	Mont.Agr.Exp.Station	
WEST-WIDE	SEMI-ANNUALLY (OCT. 1 AND APR.1)	COOPERATORS	PORTLAND, OREGON
STATES			
ARIZONA	SEMI-MONTHLY	SALT R. VALLEY WATER	PHOENIX, ARIZONA
NE VADA	MONTHLY (FEB APR.)	NEVADA STATE ENGINEER	RENO. NEVADA
OREGON	(JANMAY)	ORE.AGR.EXP.STATION	PORTLAND, OREGON
UTAH	MONTHLY (JANMAY)	UTAH STATE ENGINEERUTAH AGR.EXP.STATION	SALT LAKE CITY, UTAH
Washington	MONTHLY (FEBMAY)	WASH. STATE DEPT. OF CONSERVATION AND DEVELOPMENT	SPOKANE. WASHINGTON
WYOMING	MONTHLY (FEB JUNE)	WYOMING STATE ENGINEER	CASPER, WYOMING

Copies of the various reports may be secured from: Head, Water Supply Forecasting Section Soil Conservation Service 209 S.W. 5th Avenue, Portland 4, Oregon

PUBLISHED BY OTHER AGENCIES

οт	HER SNOW SURVEY	REPORTS			
	BRITISH COLUMBIA	MONTHLY	(FEBJUNE)COMPTROLLER. AND FORESTS.	WATER RIGHTS BR., PARLIAMENT BLDGS.	DEPT. OF LANDS VICTORIA, B.C.
	CALIFORNIA	MONTHLY	(FEB MAY)	IA DEPARTMENT OF W	ATER RESOURCES.

FEDERAL-STATE COOPERATIVE

SNOW SURVEYS AND WATER SUPPLY FORECASTS

for

COLORADO RIVER, PLATTE RIVER ARKANSAS RIVER AND RIO GRANDE DRAINAGE BASINS

Issued

May 10, 1958

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United States Department of Agriculture
Soil Conservation Service
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Colorado Agricultural Experiment Station
Fort Collins, Colorado
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General Series Paper No. 677 Colorado Agricultural Experiment Station

Snow Survey measurements in Wyoming, Utah, and Arizona are supplied by Snow Survey Supervisors, Soil Conservation Service, in those states.

WATER SUPPLY OUTLOOK COLORADO, RIO GRANDE, PLATTE AND ARKANSAS DRAINAGE BASINS

May 1, 1958

WATER SUPPLY OUTLOOK IS GOOD FOR ALL AREAS OF COLORADO AND NEW MEXICO FOR 1958 AS WELL AS FOR THE COLORADO RIVER TRIBUTARIES IN UTAH AND WYOMING. SNOW COVER IN THE MOUNTAINS RANGES FROM NORMAL TO 140 PERCENT OF NORMAL WITH THE EXCESS IN SOUTH-WESTERN COLORADO. NO WATER SHORTAGES ARE EXPECTED. APRIL RUNOFF WAS HIGH IN WESTERN COLORADO DURING APRIL BUT A HEAVY SNOW PACK REMAINS AT HIGH ELEVATIONS.

SURFACE WATER SUPPLY IN ARIZONA HAS BEEN RELATIVELY GOOD BUT CONTINUED USE OF GROUND WATER HAS BEEN NECESSARY.

COLORADO. As indicated by the late season snow pack, runoff from mountain streams will be normal to well above normal in 1958. Relatively heavy flows have occurred in the San Juan Basin and on the Gunnison River and much above normal is expected through the summer months. The snow pack in this latter area is a little below the maximum recorded on May 15 and June 1, 1957. Soils under the snow are at field capacity.

The water supply outlook is improved materially by the relatively large carryover in storage from the heavy streamflow of 1957. Water in most reservoirs is far above average and in some instances the reservoirs contain several times that stored on this date a year ago. Soil moisture in irrigated areas is regarded as good as compared to recent drouth years. Soils under the snow are at field capacity over Colorado except for a limited area on the northern tributaries to the South Platte.

Snow measurements will be continued over the state until June 1 at 15 day intervals to maintain an inventory of mountain snow pack. No shortages of water are expected even with large deviations from normal snowfall. Excessive water can occur in some areas if May snowfall should be much above normal.

NEW MEXICO. Runoff in the Rio Grande and Rio Chama was rather high during April but snow pack above 10,000 feet is still 140 to 150 percent of normal for May 1. Runoff was caused by melt of low elevation snow on saturated soils. The seasonal flow of the Rio Grande is expected to be above normal but not excessive. Storage in reservoirs on this stream are near normal as compared to less than one-quarter of normal a year ago.

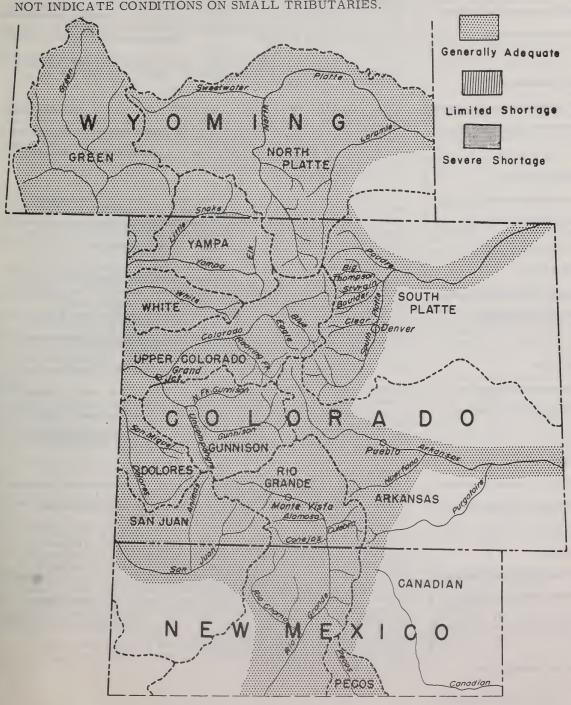
With storage substantially above normal, the water supply outlook for the Tucumcari and Carlsbad projects in Eastern New Mexico is good. The flow of the San Juan and its tributaries through New Mexico will be much above normal.

COOPERATIVE SNOW SURVEYS SUMMARY OF SNOW MEASUREMENTS

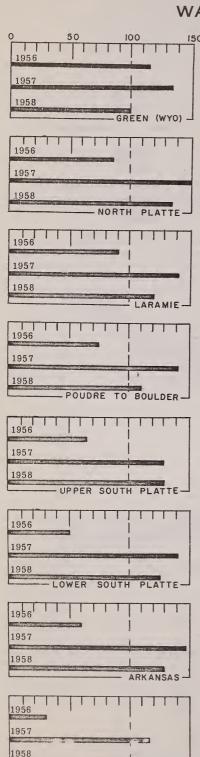
May 1, 1958												
WATERSHEDS	No. of Courses Averaged	Years of Record		Content rcent of Avg.	WATERSHEDS	No. of Courses Averaged	Years of Record	Water C as per 1957	Content cent of Avg.			
ARKANSAS RIVER					PLATTE RIVER							
Arkansas River	7	9-22	86	133	Sweetwater	2	18-21	59	78			
21111011000 211101	•	0 22	00	100	North Platte River	10	20-22	88	121			
COLORADO RIVER					Laramie River	8	9-22	74	114			
Colorado River*	20	9-22	81	127	South Platte River**	3	9-22	74	140			
Roaring Fork	4	12-22	65	113	Poudre River	6	9-20	82	130			
Plateau Creek	2	18-21	100	131	Big Thompson River	3	9-22	70	104			
Yampa River	5	22	91	135	St. Vrain River	2	9-22	62	92			
White River	2	22	81	157	Boulder Creek	1	19	69	112			
Gunnison River	8	9-22	92	132	Clear Creek	3	9-22	86	123			
Dolores River	3	21-22	81	146								
Green River (Wyo.))				RIO GRANDE							
San Juan River	3	18-22	72	98	Rio Grande (Colo.)	6	9-22	76	143			
Animas River	1	22	85	300	Rio Grande (N. M.)	-						
					Conejos River	4	9-22	54	113			
					Alamosa River	2	18-21	59	79			

WATER SUPPLY OUTLOOK

THE MAP ON THIS PAGE INDICATES THE MOST PROBABLE WATER SUPPLY AS OF THE DATE OF THIS REPORT. ESTIMATES ASSUME AVERAGE CONDITIONS OF SNOW FALL, PRECIPITATION AND OTHER FACTORS FROM THIS DATE TO THE END OF THE FORECAST PERIOD. AS THE SEASON PROGRESSES ACCURACY OF ESTIMATES IMPROVE. IN ADDITION TO EXPECTED STREAMFLOW, RESERVOIR STORAGE, SOIL MOISTURE IN IRRIGATED AREAS, AND OTHER FACTORS ARE CONSIDERED IN ESTIMATING WATER SUPPLY. ESTIMATES APPLY TO IRRIGATED AREAS ALONG THE MAIN STREAMS AND MAY NOT INDICATE CONDITIONS ON SMALL TRIBUTARIES.



WATER SUPPLY OUTLOOK



PURGATOIRE-CUCHARAS

THE BAR CHARTS ON THIS AND THE NEXT PAGE REPRESENT GRAPHICALLY THE MOST PROBABLE WATER SUPPLY OUTLOOK FOR 1958 AS COMPARED TO THE PAST YEARS 1956 AND 1957. STREAMFLOW AND OTHER FACTORS FOR 1957 ÅRE PARTIALLY ESTIMATED BECAUSE FULL DATA ON WATER SUPPLY CONDITIONS IS NOT YET AVAILABLE. ESTIMATES OF PAST CONDITIONS AND FORECASTS HAVE BEEN MADE BY THE AUTHORS OF THIS REPORT.

GREEN: The flow of the Green in Wyoming and Utah will be about average and adequate to meet local irrigation needs. Winter snow pack and fall precipitation have been near normal.

NORTH PLATTE: Water supply on the North Platte should meet demands this year even if late season snowfall is deficient. Present indications are for a little above normal inflow to Seminoe and Pathfinder reservoirs. In addition there is now stored in Seminoe, Pathfinder, Alcova and Guernsey reservoirs about 1,500,000 acre-feet which is almost twice normal and over twice that for a year ago. Of this amount about 900,000 acre-feet is assigned to the older North Platte project.

LARAMIE: At the present time the snow and soil moisture measurements indicate that streamflow will be slightly above normal on the Laramie River in 1958. With 90,000 acre-feet in storage in Wheatland Reservoir, the water supply for the Wheatland area will be much better than for any recent year preceding last year.

POUDRE-BOULDER: The flow of the Poudre, Big Thompson and Saint Vrain Rivers and Boulder Creeks will range from normal to slightly above normal for 1958. Snowpack on the Poudre is slightly above normal but on the other watersheds there is some deficiency. Water supply outlook is good. Storage is about 70 percent of capacity as compared to 25 percent a year ago in the smaller irrigation reservoirs. Soil moisture conditions in irrigated areas is much improved over the past few years. In addition to the natural water supply there is a total of about 245,000 acre-feet in Horsetoth and Carter Lakes and 350,000 acre-feet in Granby including dead storage. A full allotment has been made of this Colorado-Big Thompson water.

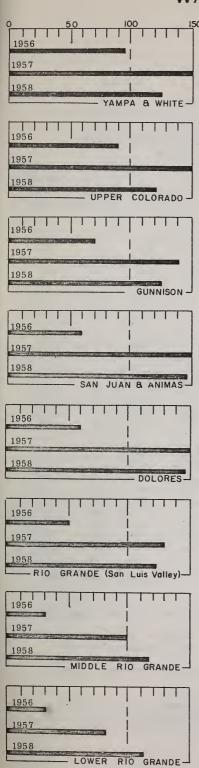
UPPER SOUTH PLATTE: Snow and soil moisture measurements indicate that the summer flow of the Upper South Platte River and Clear Creek will be near normal. Municipal reservoirs of the City of Denver were filled during snow melt last summer and are still at over 90 percent of capacity. Storage in irrigation reservoirs is also relatively high. Soil moisture conditions are good. A heavy excess of water is not probable.

LOWER SOUTH PLATTE: The water supply outlook for the Lower South _ Platte is good. Reservoir storage is near capacity. Soil moisture conditions are good. Streamflow through this area will be much above normal in May and June because of prospective lack of demand on the upper South Platte and its tributaries. Present streamflow is relatively high.

ARKANSAS: Remaining snow pack is 130 percent of normal. The most probable summer streamflow of the main stream at Pueblo will be slightly more than normal. In contrast to the past several years, reservoir storage is excellent. Last year storage throughout the valley was practically non-existent. John Martin reservoir now has in storage about 290,000 acre-feet. Usually the water content is near zero. This storage in reservoirs materially improves the outlook. In contrast to recent years, valley soil moisture is reported as good.

PURGATOIRE-CUCHARAS: Water supply outlook is fair to good for the Purgatoire, Cucharas and Huerfano Rivers. Much of the water supply depends on later precipitation.

WATER SUPPLY OUTLOOK



Average

YAMPA-WHITE: Snow pack is 135 percent of normal on the headwaters of the Yampa River and 160 percent of normal on the White River headwaters. Water supply for next year will be adequate to meet demands. No excessive streamflows are anticipated. Soil moisture conditions in valley areas are fair to good.

UPPER COLORADO: Snowpack and soil moisture conditions are about 120 percent of normal on the Upper Colorado River watershed. Summer streamflow should be slightly greater than average. Soil moisture conditions at lower elevations are good which indicates reasonably adequate water supplies for the smaller irrigated areas along tributary streams.

GUNNISON: Water supply outlook for irrigated areas served by the Gunnison, North Fork and Uncompander Rivers is good for 1958. Remaining snow pack is about 130 percent of normal. Summer flow will be. substantially above normal but less than in 1957. Taylor Park reservoir contains 76,000 acre-feet as compared to 26,000 a year ago. Soil moisture conditions in valley areas are good and present streamflow is above normal.

SAN JUAN-ANIMAS: Runoff was excessive during April due to melt of low elevation snow pack. Snow accumulation during April was near normal. Snow water contents for all courses is still about 145 percent of normal. The water contents are only slightly less than those measured on May 15 and June 1 a year ago. Streamflow is expected to be near normal for the Upper San Juan. The flow of the Los Pinos, Animas and Florida Rivers will be much above normal but probably slightly less than for the 1957 season.

DOLORES: The summer flow of the Dolores River will be much above normal and may equal that for 1957. Snowpack is 146 percent of normal and 80 percent of May 1, 1957. April flow was exceptionally high. Mountain soils are saturated. Storage in Groundhog is now about 19,000 acrefect or twice normal. Narraquinepp Reservoir is near capacity.

RIO GRANDE (San Luis Valley): The flow of the main stem of the Rio Grande into San Luis Valley is now forecast ababout 110 percent of normal. The flow of the Alamosa and Conejos will be slightly less than normal. Reservoir storage is two to three times normal. Flow in excess of 150 percent of normal is expected into the Rio Grande Reservoir on the extreme upper watershed. The flow of streams from the Sangre de Cristo range is expected to be slightly above average.

MIDDLE RIO GRANDE (New Mexico): Heavy streamflow occurred from lower elevation snow melt during April. Snowfall at higher elevations remaining is about 150 percent of normal in Northern New Mexico and 140 percent of normal in Colorado. Soil moisture under the snow is at field capacity. The flow of the river through the Middle Rio Grande Valley is forecast in the range of 125 percent of normal for the summer months. The flow of tributary streams in Northern New Mexico can be expected to have above seasonal average flows. Soil moisture in irrigated areas is relatively good.

LOWER RIO GRANDE (New Mexico): Inflow to Elephant Butte during the summer months should be about 125 percent of normal. Much will depend on late season snowfall and winter storms. Storage in Elephant Butte and Caballo reservoirs is now almost 900, 000 ac re-feet as compared to 55,000 on May 1, 1957. Soil moisture conditions are relatively good. The water supply outlook is the best for several years.

Water supply outlook for the Carlsbad Project on the Pecos River is good with 100,000 acre-feet of water stored in Alamogordo reservoir. Soil moisture conditions in the irrigated area are good.

FOR DETAILS ON WATER SUPPLY CONDITIONS ON THE COLORADO RIVER DRAINAGE IN UTAH AND ARIZONA, NOT LISTED OR DISCUSSED IN THIS REPORT, REFERENCES SHOULD BE MADE TO THE STATE SNOW REPORTS FOR UTAH AND ARIZONA (see inside cover).

STREAMFLOW FORECASTS

APRIL-SEPTEMBER INCLUSIVE May 1, 1958

"The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature during the forecast period will be near average. Appreciable deviations from normal of temperature and/or precipitation during the forecast period will correspondingly modify these forecasts."

BASIN AND STREAM	1958 Forecast 1000 AF	1958 %Avg. 1938-52	15-Yr. Avg. 1938-52	BASIN AND STREAM	1958 Forecast 1000 AF	1958 %Avg. 1938-52	15-Yr. Avg. 1938-52
NORTH PLATTE			,	COLORADO			
Sweetwater at Alcova	47	65	73	Gunnison at Gr. Junction	2000	132	1510
North Platte at Saratoga	775	118	657	San Juan at Rosa, N.M.	675	96	703
Medicine Bow near Hanna	116	105	111	Piedra at Piedra	275	128	215
Laramie at Jelm	115	110	105	Los Pinos nr Bayfield (7)	310	136	- 228
				Florida nr Durango	95	138	69
SOUTH PLATTE				Animas at Durango	750	144	522
Cache La Poudre at Canon (1) 250	114	220	La Plata at Hesperus	42	138	30
Big Thompson at Drake	105	95	111	Dolores at Dolores	425	136	314
Saint Vrain at Lyons	90	102	88	Colorado nr Grand			
Boulder at Orodell	60	109	55	Canyon, Arizona	12,000	119	10,069
Clear Creek at Golden (2)	165	117	141				
` '				GREEN RIVER			
ARKANSAS				Green at Linwood, Utah	1290	99	1302
Arkansas at Salida (3)	425	131	323	Little Snake at Lily	390	107	365
Arkansas at Pueblo (3)	450	112	401	Elk at Clark	250	117	214
Cucharas at La Veta	17	106	16	Yampa at Steamboat Spgs.	325	116	. 281
Purgatoire at Trinidad	60	105	57	White at Meeker	425	126	336
COLORADO				RIO GRANDE			
Colorado nr Granby (4)	240	121	199	South Fork at South Fork	130	98	132
Willow nr Granby	5 2	. 121	43	Rio Grande at Del Norte (8	625	111	565
Blue abv Green Mt. Res.	350	114	307	Alamosa above Terrace Re	s. 70	30	78
Colorado at Glenwood Spgs. (5) 1600	104	1540	Conejos at Mogote	200	91	220
Roaring Fork at Glenwood (6) 850	109	777	San Culebra at San Luis (9)	35	117	30
Plateau Creek at Collbran	80	129	62	Rio Chama nr La Puente	275	104	265
Uncompangre at Colona	225	132	170	Costilla at Costilla	40	118	34
Surface Cr. nr Cedaredge	25	139	18	Rio Grande at Otowi Bridge	(10) 975	115	851
				Rio Grande at San Marcial		125	619
				Pecos at Pecos	80	129	62

- Observed flow minus diversions from Michigan, Colorado and Laramie Rivers, plus diversions for irrigation and municipal use.
- (2) Observed flow minus diversions through Jones Pass Tunnel.
- (3) Observed flow plus change in storage in Clear Creek, Twin Lakes and Sugar Loaf Reservoir's minus diversions through Busk-Ivanhoe and Twin Lake Tunnels and Ewing, Fremont Pass, Wurtz and Columbine Ditches.
- (4) Observed flow plus diversions by Adams tunnel and Grand River ditch plus change in storage in Granby Reservoir.
- (5) Observed flow plus the changes as indicated in (4) plus Moffat Ditch.

- (6) Observed flow plus diversion through Twin Lakes tunnel.
- (7) Observed flow plus changes in Vallecito Reservoir.
- (8) Observed flow plus change in storage in Santa Maria, Rio Grande, and Continental Reservoir.
- (9) Observed flow plus changes in storage in Sanchez Reservoir.
- (10) Observed flow plus changes in storage in Santa Maria, Rio Grande, Continental, Terrace, Sanchez, Platoro and El Vado Reservoirs.

STATUS OF RESERVOIR STORAGE

	USABLE		BLE S' 000 A.	F.		USABLE	USABLE STORAGE 1000 A.F.				
RESERVOIR	CAPACITY 1000 A.F.		1957	15-yr. Avg. 1938-52	RESERVOIR	CAPACIT 1000 A.F.			5-yr. Avg 1938-52		
	1000 A.F.	1930	1931	1930-32		1000 A.F.	1930	1937	1930-32		
NOR'	TH PLATTE	DRAINA	GE		Δ	RKANSAS I	RAINAG	ie.			
					Twin Lakes	57.9	39.8	9.1	21.		
Kingsley	1900.0	1164.0	718.	0 1219.5*	Sugar Loaf	17.4	15.6	4.5	8		
Sutherland	70.0	45.5	70.	0 47.7	Clear Creek	11.4	9.4	5.4	4		
Minatare	58.8	47.8	22.	1 41.0	Meredith	41.9	28.3	0.0	17		
Alcova	166.0	186.8	187.	7 132.2	Horse Creek	26.9	22.5	0.0	9		
Seminoe	970.0	548.9	241.	0 338.5*	Adobe Creek	61.6	57.4	0.0	25		
Guernsey	44.3	31.3	23.	9 36.3	Cucharas	40.0	16.6	0.8	5		
Pathfinder	140.5	721.3	417.	9 493.4	John Martin	655.0	282.0	0.0	67		
					Great Plains	150.0	117.5	0.0	55		
					Model	15.0	5.1	0.7	4		
SOT	TH PLATTE	DRAIN	AGE		Conchas (NM)	600.0	211, 0		272		
					W C Austin	151.0	96.2				
Windsor	18,6	14.3	11.	5 12.9	WCAustin	131.0					
Cache la Poudre	9.5	8.4	6.	7 7.9		COLORADO	DRAINA	CF			
Fossil Creek	11.6	9.8	4.		Taylor Park	106.2	76.5		0 70		
Terry Lake	8, 2	5.8	4.		Vallecito	126.3	70.7				
Halligan	6.4	4.9	3.		Groundhog	21.7	19.0	3.			
Chambers Lake	8.8	3.6	2.			467.5	281.0	25.			
Cobb Lake	34.3	18.8	0.		Granby		46.4				
Black Hollow	8. 0	3.7	2.		Green Mountain		9, 223. 0				
Carter	112.4	100.2	76.				641.5	678.			
Horsetooth	143.5	131.6	108.	~	Lake Havasu	688.0	1,779.0	1,735.			
Lake Loveland	14.3	12.2	9.	- 1	Lake Mohave	1,810.3	1,110.0	1, 100.			
Boyd Lake	44.0	42.2	5.		PīO (GRANDE (CO	מת וח זר	AINACE			
Lone Tree	9.2	8.4	8.		Rio Grande	51.1	40.0	6.	1 16		
Mariano	5.4	5.6	5.		Santa Maria	43.6	15.4	3.			
Union	12.7	12.4	4.				33.5	7.			
Eleven Mile	81.9	97.6	23.		Sanchez	103.2		2.			
Cheesman	79.0	79.1	39.		Terrace	17.7	15.3	3.			
Marston	18.9	16.6	16.		Continental	26.7	30.4	1.			
Antero	33, 0	15.7	0.		Platoro	60.0	30.4	1.	0		
Gross	43.1	30, 7	6.		D.O.	ODANDE (N	M I DD	A TATA CIE			
Barr Lake	32.2	28.4	19.	1		GRANDE (N	754.8	52.			
Milton	24.4	16.3	2.		Elephant Butte		137.4	32.			
Standley	18.5	16.5	7.		Caballo	365.0	82.2	2.			
Marshall	10.3	8, 0	3.		El Vado	226.0	84.4	6.1			
Horse Creek	20.6	0.0	1.		Alamogordo	128.0					
Riverside	57.5	57.8	50.		McMillan-Avalo		27.2	5.	1 12		
Empire	37.7	34.5	23.		Red Bluff(Tex)	307.0	27.2				
Jackson Lake	35.4	34.3	34.			. m	. A DD 4.	MACE			
Prewitt	32.8	29.5	0	23.9		LT AND GI			1 556		
Point of Rocks	70.0	70.6	44.		Roosevelt	1,382.0	490.5	147.			
Julesburg	28.2	22.3	22.		Horse Mesa	245.1	235.9	199.			
	20.2	44.3	44.	44.0	Mormon Flat	58.0	50.0	41.			
					Saguaro	70.0	56.0	52.			
					Bartlett	180.0	164.1	166.0			
* Shorter than 1	5 year recor	d.			Horseshoe	143. 0	70.5	0	31		
					Carl Pleasant	163.8	24.3	24.6	6 35		
					San Carlos	1,205.0	228.4	0	198		

VALLEY PRECIPITATION 1/

Division Averages and Departures $^{3/}$

May 1, 1958

DRAINAGE	Fall SeptOct		Winter DecMarch		DRAINAGE	Fall SeptOctNov.		Winter DecMarch	
DIVISIONS	Avg.	Dept.	Avg.	Dept.≝	DIVISIONS	Avg.	Dept.	Avg.	Dept.
North Platte River, Wyo. South Platte River Arkansas River Colorado River Green River, Wyo. San Juan River, N.M. 1/ Preliminary analysis by furnished by Meteorolog Bureau					Colorado River, Ariz. Gila River, N. Mexico Canadian River, N. M. Rio Grande, Colo. Rio Grande, (N), N. M. Rio Grande (S), N. M. Pecos River, N. M. 2/ Departure from aver 3/ Selected Stations	3.50 6.90 3.51 5.77 3.06 7.14	/. 21 /3.36 /1.03 /2.09 /.64 /3.56	5.30 2.63 1.55 4.67 2.84 3.81	#1.62 #.16 23 #.32 #1.09 #1.10

SOIL MOISTURE MEASUREMENTS

DRAINAGE BASIN	Root	Zone Sc	il Moistu:	re Content	DRAINAGE BASIN	Root	Zone So	il Moistı	re Content
AND	Cap	1958	1957	1956	AND	Cap	1958	1957	1956
STATION	In.	In.	In.	In	STATION	In.	In.	In.	In.
NORTH PLATTE					UPPER COLORADO				
Columbine Lodge	8.0	7.0	1. 1	3.6	Vail Pass	8.0	5.7	4.5	7.5
Willow Creek	7.0	6.8	0.7	2.0	Ranch Creek	7. 0	3.8	3. 1	
Windy Point					Hairpin	8.0	4.1	1.0	
Barrett					Vasquez	7. 0	5.4	5,6	
					Gore Pass	7.0	6.5	5.8	
SOUTH PLATTE					Blue River	7. 0	5.8	0.3	
Red Feather	6.0	3.2	2.9	1.1					
Chambers Lake	7. 0	2.9	1.7	3.8	GUNNISON				
Deer Ridge	6.0	1.3	0.7	4.1	Monarch Pass	8.0	7.1	5.6	
Hidden Valley	8.0	4.1	2.9	2.9	1	0.0			
Longs Peak	7.0	2.3	2.8	6.2	RIO GRANDE (Colo.)				
University Camp	7.0	1.7	0.8	1.0	Bristol View	7.0	6.8	0.5	3.1
Berthoud Falls	6.0	1.2	0.3	1.2	Wolf Creek Pass	9.0	6.7	2.5	6.4
Alma	7.0	4.1	0.6		River Springs	7. 0	6.4	6.6	5.8
Kenosha Pass	7.0	6.6	1.4		La Veta Pass	8. 0	7.4	7.4	
ARKANSAS					RIO GRANDE (N. M.)				
Leadville	7. 0	3.9	3.9	3,6	Red River	7.0	No	t Measu	red
Lake Creek	6.0	5.0	5.4		Tres Ritos	7.0			
Garfield	7. 0	6.0	6.0		Bateman	8.0	Assur	ned to b	e at
	1.0				Chamita	8. 0	Fie	eld Capa	city
ROARING FORK					Chamila	0.0			
Placita	8.0	7.5	5.0	7.4					
Maroon	8.0	7.4	5.8	7.3					

^{*} Five year record 1952-56 inclusive. Most stations have less than five years of record.

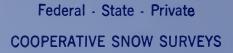
SNOW COURSE MEASUREMENTS

SWEETWATER RIVI Grannier Meadows 5 South Pass* 5 Larsen Creek 4 NO. PLATTE RIVER Cameron Pass 5 Park View Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	Date In LATTE ER //1 //23 R //4 //28		In 1958 ER DR. 11. 0 11. 4	er Cont Inches 1957 AINAGE	Ayg.	Years of Record **	SNOW COURSE		Depth 1958 Inches	1958	ter Con n Inches 1957	3	Years of Record
SWEETWATER RIVI Grannier Meadows 5 South Pass* 5 Larsen Creek 4 NO. PLATTE RIVER Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	Date In LATTE ER /1 /23 R /4 /28	RIVI	1958 ER DR. 11. 0 11. 4	1957 AINAGE								Avg. 1	Record
SWEETWATER RIVI Grannier Meadows 5 South Pass* 5 Larsen Creek 4 NO. PLATTE RIVEL Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	ER /1 /1 /23 R /4 /28	40	11. 0 11. 4		2	**	-	A 700 (17)					
Grannier Meadows 5 South Pass* 5 Larsen Creek 4 NO. PLATTE RIVER Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	R /4 /28	40	11.4	19.2			F	LATT	E RIVE	ER DRA	INAGE		
Grannier Meadows 5 South Pass* 5 Larsen Creek 4 NO. PLATTE RIVER Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	R /4 /28	40	11.4	19.2			CLEAR CREEK						
Larsen Creek 4 NO. PLATTE RIVER Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	R /4 /28				14.0	21	Loveland Pass	4/28	56	19.1	22.2	16.0	22
NO. PLATTE RIVER Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	R /4 /28	35	0 1	19.0	14.6	18	Grizzly Peak*	4/28	70	23.2	26.1	20.3	16
Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	/4		9.1	15.3		8	Empire	4/30	32	10.2	12.6	6.3	9
Cameron Pass 5 Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	/4		•				Berthoud Falls	4/30	51	17.9	23.2		7
Park View 4 Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	/28						Clear Creek	4/28	66	21.3	23.2		7
Columbine Lodge 4 Willow Cr. Pass* 4 Northgate 5	' .	83	32.9	36.1	24.3	22							
Willow Cr. Pass* 4 Northgate 5	/29	25	7.2	10.6	7.9	22	SOUTH PLATTE F			4	10.0	10.0	0.0
Northgate 5	*.	68	28.3	29.2	20.6	22	Hoosier Pass	5/1	53	17.0	19.6	12.0	22 18
0 -		40	11.8	17.5	13.5	20	Jefferson Cr.	5/1	37	10.6	14. 1 6. 4	7.5 1.7	9
Bottle Creek 4	/2	8	3.6	8.0		8	Geneva Park	4.30	6	2.1	0.4	1. (9
**** * * * * * * * * * * * * * * * * * *	'.	35	11.9	18.6	9.2	21 22	AT	TE A BYC	AC DIST	מת מש	A TRI A CIT	,	
	'.	47	17.3	21.6	16.4	22	Ar	KANS	AS RIV.	ER DR.	AINAGE	4	
		92 107	35.5 42.9	43.3 42.8	34.0 32.7	20	ARKANSAS RIVER						
	٠,	77	27.8	26.2	22.2	22	Tennessee Pass	4/29	36	13.0	13.8	6.8	22
	'.	38	13.5	13.8	7.9	22	Twin Lakes T.	4/30	37	12.4	15.7	9.5	21
Ryan Park 4 Spring Creek	,	opped	10.0	NS			La Veta Pass*	5/1	8	2.2	5.2	4. 1	22
		45	14.1	17.0		9	4 Mile Park	4/29	8	2.5	6.5	0.4	20
	/27	T	T	0.5		7	Fremont Pass	4/30	64	21.5	24.0	18.7	22
	•	18	4.4	5.5		8 .	Blue Lakes	-, -	NS	NS	10.5	7.0	20
DONCIUCI	<i>,</i> -						Monarch Pass	4/30	62	22.1	29.3	19.3	17
LARAMIE RIVER							Saint Elmo (a)	5/2	31	10.0	21.0		8
	/25	65	20.5	28.5	21.1	17	Timberline	4/30	87	31.5	28.5	20.5	9
		62	19.5	25.0	17.6	19	East Fork	4/29	34	11.2	14.6		6
McIntyre 4	/30	39	12.2	16.3	8.9	9	Westcliffe	4/30	13	1.7	6.9		5
Brooklyn Lake 4,	/23	75	26.0	33.4	23.6	22	Bourbon	5/1	30	8.5	6.3		2
Fox Park			*6	10.1	5.5	22							
	* .	13	2.9	6.8	2.5	16	CC	DLORA	ADO RI	VER DE	RAINAG	E	
, ,	' .	32	9.8	13.2	6.8	22							•
•	' .	39	11.7	16.2	11.4	22	COLORADO RIVER					24.3	22
Albany 4,	/24	45	14. 1	17.0	10.6	9	Cameron Pass*	5/4	83 32	32.9 10.7	36.1 14.7	6.8	22
							Phantom Valley	4/29 5/1	53	17. 1	19.6	12.0	22
POUDRE RIVER	/4	0.2	20.0	36.1	24.3	22	Hoosier Pass* Berthoud Pass	4/30	61	22.0	23.9	15.8	22
	*	83 25	32.9 11.0	13.9	4.4	22	Tennessee Pass	4/29	36	13.0	13.8	6.8	22
· ·	/ 4	5	2.2	3.4	0.7	22	M. Fork Camp Gr.		31	10.4	12.2	6.6	22
0	· .	62	19.5	25.0	17.6	19	Fiddler Gulch	5/1	60	20.3	25.2	16.2	20
	' .	81	27.0	34. 1	24.5	20	Lulu	5/3	66	22.5	24.8	20.0	18
	•	29	9.2	10.1	8. 2	18	Willow Creek P.	4/28	40	11.8	17.5	13.5	20
	/1	22	7.1	10.4	4.1	9	N. Inlet Grand L.	4/28	28	8.2	15.1	7.8	20
Lost Lake 5	/4	32	12.9	16.6		7	Lake Irene	4/29	81	27.0	34.1	24.5	20
							Arrow	4/30	38	13.3	19.0	7.8	20
BIG THOMPSON RIVI							Lapland	5/1	33	11.0	15.5	9.0	20
		81	27.0	34.1	24.5	20	Fremont Pass	4/30	64	21.5	24.0	18.7	22
		46	13.0	19.2	13.8	17	Lynx Pass	4/29	38	11.1	15.8	8.5	22
	* .	17	3.9	9.6	4.1	9	Shrine Pass	4/29	68	24.1	24.9 26.1	18.9 20.3	16 16
	* .	48	15.6	23.5		7	Grizzly Peak	4/28 4/29	70 25	23.2 9.2	8.8	6.6	11
Two-Mile 4	/29	61	17.7	24.3		6	Glen-Mar Ranch	5/1	22	5.9	14.1	5.9	10
T. VRAIN RIVER							Monarch Lake	4/28	15	5.0	10.0	2.4	9
	/28	43	14.3	23.0	14.9	22	Granby Grand Lake	1/20	10	0.0	7.3	3.9	9
		17	5.3	8.6	6.3	9	Berthoud Summit	4/30	81	27.4	30.0		7
		27	7.9	14.9		8	Frazer View	4/30	53	17.3	20.0		7
	, 00	-		22.0			Gore Pass	4/29	27	8.7	15.6		7
BOULDER CREEK							Frisco	4/28	29	10.3	9.9		7
	/30	79	26.6	38.8	23.7	19	Snake River	4/28	25	8.1	9.4		7
	· .	44	16.1	22.8		8	Summit Ranch	4/28	23	6.5	11.1		7
	٠.	45	13.1	19.7		5	Vail Pass	4/29	62	22.6	25.6		6
						1	Pando	4/29	39	12.9	15.7		6
							Kokomo	4/29	47	14.4	18. 1		6
On adjacent draina							Milner	4/29	47	16.4	19.7		6
** Average for cours						ord	Blue River	4/29	37	12.5	12.7		1
during the period :	1938-5	2 are	partia	Ily estir	mated.		Jones Pass	4/29	53	19.2	23.7		1 1
NS No Survey							Ranch Creek	4/29	32 41	10.2 14.1	16.4 18.5		1
a) Air observed							Vasquez Creek	4/29	41	17. 1	10.0		

SNOW COURSE MEASUREMENTS

	Depth Water Conte		ent	Years			Depth	Wate	er Conte	ent	Years		
		1958		Inches	5110	of			1958		Inches	,,,,,	of
SNOW COURSE	Date I	nches	1958	1957	Avg.	Record	SNOW COURSE	Date	Inches	1958	1957	Avg.	Record
						**							**
GOT OR	400 07		4 *** 4	a n						D	D 45354 C		
COLORADO RIVER DRAINAGE							(OLOR	ADO RI	ver D	RAINAC	i E	
ROARING FORK													
Ind. Pass Tunnel	4/29	58	21, 1	27.2	17.9	22	ANIMAS RIVER						
North Lost Trail	5/1	35	12.2	22.1	10.3	22	Ironton Park*	Snow	Slide		17.6	8.5	21
Nast	4/30	12	2.5	5.9	1.4	21	Cascade	5/1	29	10.5	12.4	3.5	22
Ivanhoe	4/30	64	18.6	30.0	19.1	12	Spud Mt.	5/1	87	35.8	37.2		7
Lift				31.0		1	Molas Lake	5/1	46	17.5	18.7		7
YAMPA RIVER							Howardville Mineral Creek	5/1 5/1	41 57	14.8 22.6	12.3 19.3		7
Dry Lake	5/1	49	29.1	26,6	15.8	22	Red Mt. Pass*	5/1	102	42.2	34.0		7
Columbine Lodge*	4/29	68	28.3	29.2	20.6	22	reca me, 1 ass	0/ 1	102		01.0		
Elk River	4/29	51	19.7	21.7	12.8	22	DOLORES RIVER						
Lynx Pass*	4/29	38	11.1	15.8	8.5	22	Rico	4/29	0	0.0	6.1	1.4	21
Routt Line		NS	NS	43.1		7	Telluride	5/2	8	3.7	3.4	1.3	22
Rabbit Ears		NS	NS	41.9		7	Lizard Head	4/29	59	23.4	24.1	15.9	21
Yampa View	4/30	41	16.6	16.8		7	Trout Lake	5/3	49	18.5	18.5	6.8	9
Flat Top	drop	•		NS									
Bear River	4/30	31	11.6	14.0		2	GREEN RIVER (WY			0.0			10
Clark	4/29	19	7.3	10.6	22 7	2	Dutch Joe	4/24	23	6.0	11.7	4.4 6.5	19 22
Old Battle*(Wyo)	4/30	92	35.5	43.3	33.7	22	Mulligan Park Kendall R.S.	4/30	25	9.5	11.0 12.2	6.3	19
WHITE RIVER							Loomis Park				18. 1	11.8	19
Burro Mountain	5/2	60	23.2	26.3	15.2	22	Snyder Basin R.S.				18.8		3
Rio Blanco	5/1	41	16.9	23.4	10.4	22	Piney-LaBarge				25.6	13.2	21
	-, -						, 8						
PLATEAU CREEK							RIO GRANDE DRAINAGE						
Mesa Lakes	4/20	67	27.1	27.4	15.0	21							
Trickle Divide	4/29	88	34.5	34.4	31.9	18	RIO GRANDE IN CO			0.0 4	20.4	000	22
GUNNISON RIVER							Wolf Creek Pass	4/30	70 13	26.4 7.9	39.4 8.0	28.2	22
Crested Butte	4/30	25	11.3	16.6	7.3	22	Upper Rio Grande Santa Maria	4/29	70	2.0	3.4	1. 1	19
Park Cone	4/30	33	8.7	19.1	5.8	21	Pyramid	1/20	NS	NS	8.0	3. 1	9
Alexander Lake	4/29	79	31.2	28.5	24.4	21	Spring Creek Pass		NS	NS	11.3	5.0	9
Ironton Park		Slide		17.6	8. 5	21	Pool Table	4/28	18	5.2	6.8	1.2	9
Trickle Divide .	4/29	88	34.5	34.4	31.9	18	L. Humphreys	4/28	3	0.8	1.0	0.1	9
Park Reservoir	4/29	7.7	30.5	32.5	27.4	18	Cochetopa Pass	4/29	24	7.7	7.1	1.8	9
Porphyry Creek	4/30	61	21.9	28.6	17.9	18	Red Mt. Pass	5/1	102	42.2	34.0		7
Kannah Cr.		NS	NS	NS			Porcupine	4/28	36	11.4	11.2		7
Lake City	4/30	31	11.9	44.0	2.8	10	Wolf Creek Summit	* .	98	36.6	44.9		7
Spring Cr. Pass*	4/29	NS 24	NS 7.7	11.3	5.0	9	Hiway Pass Creek	4/30 4/30	82 17	29.2	40.7 11.6		1
Cochetopa Pass* McClure Pass	5/1	38	13.7	7.1 25.2	1.8	8	Pass Creek	4/30	11	J. 4	11.0		
Red Mt. Pass	5/1	102	42.2	34.0		6	ALAMOSA RIVER						
Blue Mesa	0/ 1	NS	NS	10.3		1	Silver Lakes	5/1	8	1.8	1.9	1.1	21
							Summitville	4/27	61	17.7	31.1	23.7	18
SAN JUAN RIVER													
Wolf Creek Pass*	4/.30	70	26.4	39.4	28.2	22	CONEJOS RIVER						
Upper San Juan	4/30	88	34.0	45.0	32.8	22	River Springs	4/29	2	1. 1	5.3	1.0	21
Granite Peaks		0	0.0	0.0	0.8	18	Cumbres Pass	4/28	52	19.9	32.1	17.2	22
La Plata	4/20	NS	NS	21.0		8	Platoro	4/27	40	12.5	23.6	9.5 4.4	9
Wolf Creek Summit Chama Divide*	*.	98 0	36.6	44. 9		7	West Conejos La Manga	4/30	11 NS	2.9 NS	6.8 27.0	14.2	9
Chamita*	4/29 4/29	11	0.0 3.7	NS 3.7		1	na manga		143	245	21.0		
	2, 20	**	0. 1	0.1		1	SANGRE DE CRISTO	O RAN	GE (CO	LORAI	00)		
* On adjacent drain	age						LaVeta Pass	5/1	8	2.2	5.2	4.1	22
**Average for cour:						rd	Culebra	5/1	43	10.1	9.8	9.7	18
during the period	1938-53	2 are p	partiall	y estima	ited.								
NO No Co							RIO GRANDE IN NE			0 5	0 77		
NS No Survey							Chamita	4/29	11	3.7	3.7 3.2		
							Rio En Medio	4/30	29	10.8	5. 4		





Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"